

WHAT IS CLAIMED IS:

1. A method for separating a rare cell from other cells in a cell population:

- applying cells from the cell population to a surface;
- determining the location of the rare cell on the surface and overlaying the cells with a solidifiable material, wherein a cover layer is formed;
- illuminating the cover layer with light focused at the location identified in step (b) whereupon a solid plug is formed from the solidifiable material at the location; and
- removing the solid plug from the surface, wherein the rare cell adheres to the solid plug, whereupon the rare cell is separated from other cells in the cell population.

15 2. A method for analyzing DNA of a rare cell in a cell population comprising:

- applying cells from the cell population to a surface;
- determining the location of the rare cell on the surface and overlaying the cells with a solidifiable material, wherein a cover layer is formed;
- illuminating the cover layer with light focused at the location identified in step (b) whereupon a solid plug is formed from the solidifiable material at the location;
- removing the solid plug from the surface, wherein the rare cell adheres to the solid plug; and,
- analysing the DNA of the rare cell.

25 3. The method of claim 1 wherein the solidifiable material comprises at least one compound selected from the group consisting of ethylene, styrene, substituted styrenes, propylene, vinyl, vinyl alcohols, vinyl acetals, methacrylate, urethane, neopentyl glycol dimethacrylate, poly bis phenol A-co-epichlorohydrin, epoxy resin, bis-phenol A type epoxy acrylate oligomer, polyethylene glycol dimethacrylate, penta-erythritol tetracrylate, urethane acrylate oligomer, neopentyl glycol dimethacrylate, polyethylene glycol

dimethacrylate, methylphenylglyoxylate, polybutylmethacrylate, and trimethylol trimethacrylate.

4. The method of claim 1 wherein the solidifiable material comprises
5 2,2-dimethoxy-2-phenyl acetophenone or 2,2-diethoxyacetophenone.

A method for analyzing DNA of a rare cell in a cell population comprising:

- (a) applying cells from the cell population to a surface;
- (b) determining the location of the rare cell on the surface, and overlaying a solidifiable material, wherein a cover layer is formed,
- (c) illuminating the cover layer with light focused at the location
- Step (b), whereupon a solid plug is formed from the solidifiable material at the
- (d) removing the solidifiable material which is not solidified;
- (e) treating the surface with a DNA-inactivating agent;
- (f) removing the solid plug from the surface to expose the rare cell; and
- (g) analyzing the DNA of the rare cell.

6. The method of claim 5 wherein the rare cell is a fetal cell, and the cell

20 population is maternal blood.

7. The method of claim 6 wherein the fetal cell is a nucleated red blood cell.

8. The method of claim 5 wherein the rare cell is a malignant cell.

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9. The method of claim 3 wherein the cell population is in a tissue section.

10. The method of claim 5 wherein the solidifiable material comprises at least one compound selected from the group consisting of ethylene, styrene, substituted styrenes, 30 propylene, vinyl, vinyl alcohols, vinyl acetals, methacrylate, urethane, neopentyl glycol dimethacrylate, poly bis phenol A-co-epichlorohydrin, epoxy resin, bis-phenol A type epoxy acrylate oligomer, polyethylene glycol dimethacrylate, penta-erythritol tetracrylate,

urethane acrylate oligomer, neopentyl glycol dimethacrylate, polyethylene glycol dimethacrylate, methylphenylglyoxylate, polybutylmethacrylate, and trimethylol trimethacrylate.

5 11. The method of claim 5 wherein the solidifiable material comprises 2,2-dimethoxy-2-phenyl acetophenone or 2,2-diethoxyacetophenone.

10 12. The method of claim 11 wherein the solidifiable material comprises 2,2-dimethoxy-2-phenyl acetophenone.

13. ~~The method of claim 5 wherein the analysis is carried out after the rare cell is removed from the surface.~~

14. The method of claim 5 wherein the analysis of the DNA from the rare cell 15 comprises amplifying the DNA of the rare cell.

15 16. The method of claim 14 wherein the amplification is by the polymerase chain reaction.

20 17. The method of claim 14 wherein the amplification is by the ligase chain reaction.

25 18. A kit comprising instructions describing the method of claim 5 and at least one of a photoreactive cross-linker, a photoinitiator, and a plastic monomer.

30 19. A method for amplifying DNA of a rare cell in a cell population comprising:
 (a) applying cells from the cell population to a surface;
 (b) determining the location of the rare cell on the surface, and overlaying the cells with a photodepolymerizable coating, wherein a cover layer is formed;

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identified in step (b) to solubilize the material at the location;

exposed; and

- (c) heating the cover layer to make it solid;
- (d) illuminating the cover layer with light focused at the location
- (e) removing the solubilized material; whereupon the rare cell is
- (f) amplifying the DNA of the rare cell.

20. The method of claim 18, wherein the photodepolymerizable coating is a novolak resin.